doc. 0282 1958-2

Document # 282

UNITED STATES
DEPARTMENT OF THE INTERIOR

D!-6

APPROVED DECEMBER 1941

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7048


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[Solen]

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**Loc. 58** French ranch localities. Sections measured in SW-facing bluffs in amphitheater-like end of spur in and ESE of center SW¼, sec. 31, T. 15 N., R. 23 E., Lantry NE quad. Dewey Co. Actually on tribal land, but French leases for cattle; access thru French ranch.

Section 1. Measuring up from big bentonite

| | | |
|---|---|---|
| (2) | 1.6 | Bentonite, light olive-green, soapy. contains [silty] cone-in-cone cones. |
| | 6.0 | Shale, gray, fissile, with silt laminae scattered thruout, some Fe yellow brown to brown stain on bedding & fracture surfaces. About 2' from top - Fe brn ls cone bearing 8" diam. |
| (3) | 0.1 | Jarosite band - light gray, soft silt masses with jarosite rinds. |
| (4) | 18.0 | Clay, silty, shaly in lower 2 feet ± and some shaly layers locally but mostly blocky fracturing gray to light gray silty clay, with silt blebs and some laminae fracture surfaces weather purple Slope weaths lite gray. |
| 5. | 3.0 to ? | Clay, as above, jarosite band at base, at 1.3 - 2.3 above base. |

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scattered rusty brown weath. small <1' limestone concs, hard dk blue ls, some silty jackets. Rarely fossiliferous but include small Sphenodiscus, big Sphenodiscus

Section 2. - Joins above at the 1.6 bentonite. Measuring up towards bentonite

- - - Layer of scattered limestone concs up to 2' in diam., weath. reddish grey, some golden calcite in cracks Small fauna. (58-22)

① 9.5 Earthy dark grey, grey, and brownish grey clay, locally somewhat shaly but chiefly blocky, silty thruout. From 2' above base is brownish, weaths to distinctive light brownish grey slope, some pink tinge. Jarosite band 4.5 from base. 6.0 above is zone scattered hard blue-grey ls. concs weath whitish grey to grey with reddish tinge. This unit is siltier in top part which has irreg patches silt. The

1.0 above Jarosite at 4.5 is conc with sapiod (A 1407)

Fe stain on silt + ptgs gives it its distinctive weathered color.

② 9.2 Shale, ~~dark~~ light gray, weathers light gray, flaky finely silty, some silt laminae and pods. 6.0 from base is vfg sand + silt layer impreg. with jarosite. Between this jarosite layer and bentonite shale is blocky to splintery and light brownish gray with some pink cast and purple brown stain on fractures.

③ 1.6 Bentonite, olive green, with cone-in-cone cones. (Same as at base of section 1.

Section 3. Measuring up from highest siderite conc. layer in Elk Butte. Concs are 1' ± in diam, hard, weath maroon are light brownish gray inside.

Conc. in place

① 15.5 Shale, gray, silty, weathers to light gray flakes. About 3' above base is dark gray, earthy-weathering to popcorn (prob. bentonitic) up to about 11' above base. On fresh surface it is good shale throughout.

② 13.3 Shale, gray, silty, similar to below ① but with thin interbeds and laminae of silt. This is lower 3.0 feet ±. Above silty zone is earthy dark gray silty clay shale chiefly blocky, which grades into Fe stained, siltier gray shale about 5.5 from top. Bp taken at thin jarosite layer

③ 11.0 Clay, locally shaly but mostly blocky, mixed clay and silt, Fe brown + rusty stain on fresh, weathers to brownish gray slope. At 5.5 weak jarosite layer, a few scatt. concs.

made up of thick grey silty CaCO3 cemented jackets, ~~some with~~ and some with Is cores below this + jarosite at top
At top is jarosite band, also one 2' below it. Conc. 14 + above top jarosite

(4) 1.5 Dark grey clay, earthy som jarosite blebs, scattered ls. concs with cone-in-cone jackets.

(5) 13.0 Shale, grey, weathers lite brown grey or brownish in lower 5 to 8' and forms lite brown band on outcrop. Upper part weathers grey, some jarositic silt at top. Abundant cones scat through chiefly in upper 10'. Some small gray-white-weath cones, some larger weath lite brnish or or grey white. Lucina occidentalis and one fragment of Dinocallista seen.

A494 >

(6) 8.5 Popcorn float-crust on dk grey sh. Some red brn cones about 2' from base.

(7) 1.6 Bentonite.

Section 4- Starts at maroon-redbrn weath concs at top of section 1, unit 5., on up.

1) 3.0 Gray silty shale to jarosite layer

2) 14.0 Shale becoming siltier upward, chippy to blocky, light gray. Yellow-orange jarositic silt layer at top.

3) 37.0 Mostly slough slope on clayey buff-weathering silt. Upper 7.5 is sandy silt, vfg, buff weathering. At top layer large redbrn weath, concs. This layer appears slumped about 10 feet from main platezu top, but is discrete conc layer though intermittent one.

4) 8.5 Vfg silty SS with numerous ls concs. 1inch big Cucullaea. and other fossils. Collections from these.

Grass roots.

**Loc. 59** Oliver Jewett river land east of Rt. 65. Bluffs along field road in W½, SW¼, NE¼, sec. 1, T. 14 N., R. 21 E., Lantry NW. quad. Ziebach Co.

These bluffs have slumped somewhat, possibly 20 feet or more relative to conc. zones in larger exposure in bluff at center NE¼, sec. 1. Latter a more complete exposure.

Section 1. Southernmost of two in easternmost gulley draining SW on to lower terrace. Measuring up in gulley from base dug trench.

1 5.5 Shale, grey, finely silty, a few thin bands silt 1.6 above base. Becomes brownish stained above silt bands, is dark grey below.

2 2.3 Shale with [illegible] silt up to 2" thick. Slope [illegible]

A' bentonite [illegible] to D.1 of Lantry. Top shale [illegible] local wash. Cone-in-cone

3 7.8 Shale [illegible] silt layers & lam. [illegible] zone dark purple-red [illegible] comes lite brn grey on

5'-7'

27

3

from surface calc bul... very q. Mds
Spicnodiscus fwgs. sizes

(4) 15.5 Shale, gray, scatter. J silt laminae and thin beds, some beds (silt) yellowish gray. His[illegible] silt [illegible] of [illegible] sized limy conc. [illegible]

(5) 8.9 (changed to 9.0) Silt, shaly, interbedded with gray shale as below, contains [illegible] silt beds up to 3" thick. Zone scattered dk gray ls concs in concretionary silt jackets in upper 1.5, with jackets up to 4' long diam (Hoodoos) [illegible] ammonite frags. Also scattered red brown weath ls concs, [illegible] from base. Upper concs have [illegible] calcite in cracks.

6) 10.0 Shale as below (5), possibly with fewer silt beds, than. Shale beds. At top, in grass roots, is zone scattered dk blue ls concs which weather with OB to red brown, surface to jackets, but brown, [illegible]

Section 2.

Measuring up from large scattered large cones. below this bentonite.

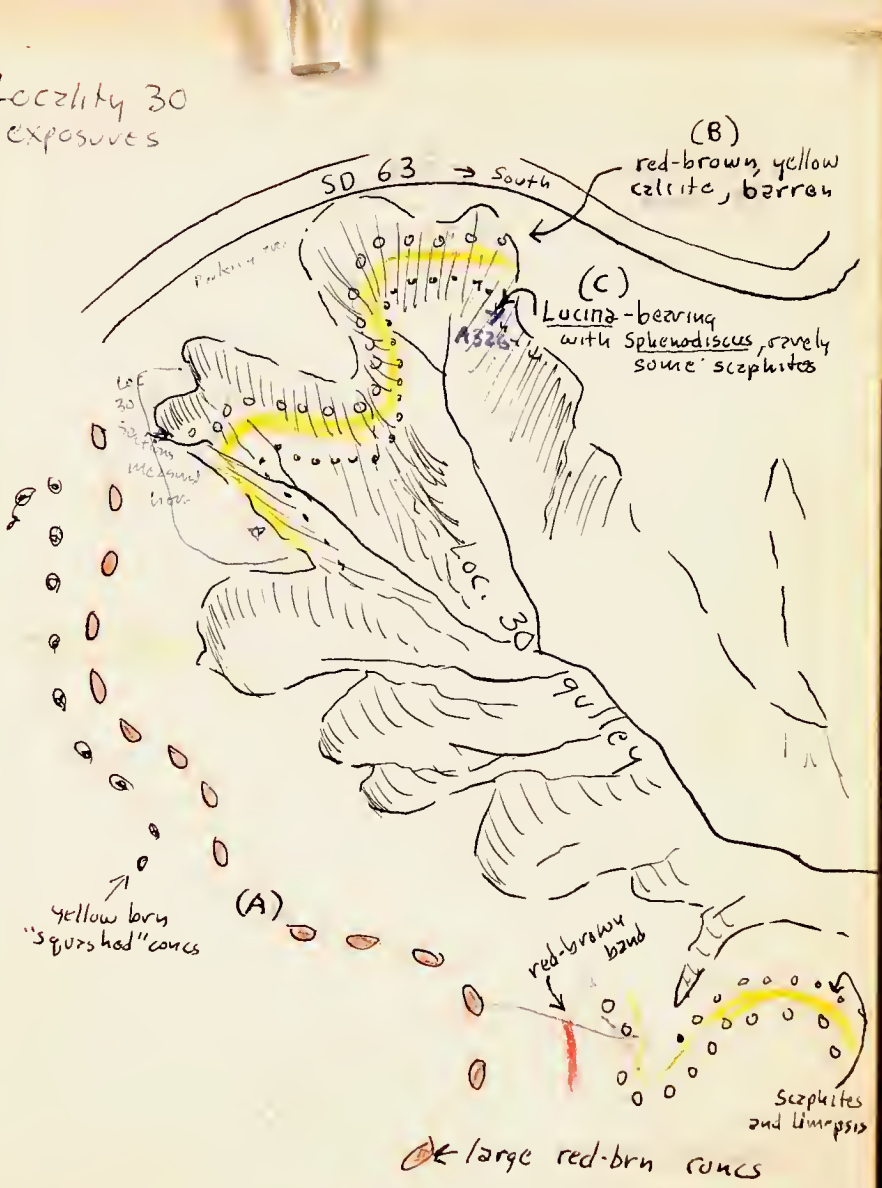
12.7 Shale, grey, fissile silty, scattered thin layers of yellowish-grey weath. silt. Upper 3' is brownish stained in cracks and thin lower part. Scattered red beds to possible CB worth 1s cones up to 5" diam in upper 2nd. Cones at base up to 1" diam, blue grey with yellow tubules, weath. O, red brown.

12.0 Sandy with numerous thin beds of silt up to 0.1 thick. Sharp contact with CB below.

11.5 Cup-in-cone cones at bentonite horizon / "A" bentonite

Note - [illegible] cones within 16.5 feet below cones at base of B. Imprint of large Scaphite in this cone layer, also Yoldia. Silt decreases [illegible] cones. Good CB below as far as shown.

A495


Locality 30
exposures
(B)
red-brown, yellow
calcite, barren
SD 63 → South
(C)
Lucina-bearing
with Sphenodiscus, gravely
some scaphites
A326
Loc. 30
gullies
(A)
yellow brn
"squashed" concs
red-brown
band
Scaphites
and Limopsis
large red-brn concs

Pt. 63, Loc. 30 reconnaissance.

West along section gulley traced large brn. weath barren conc layer (A) where it's crop swings NW back toward road it is 65 feet ± down to upper red brown layer in gulley. (B) About 46' up from lz Har (B) scattered small, up to 1', ls concs weath brn ± OB-PB some silt jackets, no fossils seen. About 20 or few more feet from lower concs (B) is the silty OB stained zone.

From (B) conc layer down to (C) layer is 23.5'. (C) layer brittle dk blue-grey limestone concs weathering hte reddish brown to grey white. Between B and C layers is the jarosite silt zone with scattered silt jacketed concs and cone-in-cone concs.

From (C) layer down is brownish-grey weathering zone for 14 or 15 feet, then rather abrupt change to light bluish grey. Small concs, whitish rind some with ammonite frags in float in brown-stained zone. Also 2 conc which may be from (C) layer or in brown-stained zone below, or within upper 8 feet of blue-grey zone. Has Limopsis concretions

12

On hill S of parking area (30 D)(197)

Loc. 197 Both (B)+(C) well exposed on SW slope. Several collections from (C which has rare Limopsis recurva. From B to brown zone it is 23½ feet, and from here to the "brown with red" concs, which cap the hill, another 16 feet.

Loc 198 On elongate ridge to south — (30-E). The C conc layer is caprock for most of it. Some white rind-"algal marked" concs 7 to 10 feet below it have Sepioid and crab claw.

Correlating with section at 30-C, Nibbs 59-1, p. 33 —

| Loc. 30, D, E (197, 198) | | Loc. 30-C (196) |
|---|---|---|
| A layer 19' | = | D layer 17' |
| Small concs yellowbrn rind + purple-red core 16' | | 18' |
| Brown-stained silty + sandy zone 20'-23' | | 25' |
| B layer | = | A layer |

Loc 30-E (cont.)

Found 2 more sepioids within 8 feet of the Lucina conc. layer (c). About 35' beneath it, D. nicolleti in place. Also "preneboscensis" type in float between 5' and 15' beneath the (c) layer.

Peanut brittle concs begin to turn up lower than the Lucina conc. layer. - went across road to East to investigate.

Loc 30-F - Bluffs containing Elk Butte - T.C. contact just east of Rt 63.

loc. 199

Here more fossils appear in the section and succession is more apparent - need a detailed section here. Arenosite becomes common again at the D. nic. horizon, small D. nic concs more common. Limopsis concs come in at first red-brn weath concs just above D. nic, and still in Arenosite zone #1. But - local rare Limopsis accumulations also in the "C" conc layer along with rare P. neboscensis ones and

fairly common ammonoid concs which include small + large spheres, spiny scaphites.

Just below the "C" zone is the persistent brown-weathering band, and above it the second Jerosite zone.

All these should be tied by section to locality 30-C and that measured in detail.

Loc. 20-A

Southwest-facing bluffs southeast of locality 20, on same west-trending spur as 20, in the NW¼, sec. 9, T. 20 N., R. 27 E, Little Eagle 7½' quad, Corson Co..

Here the Timber Lake-Trail City contact is sharp and the "Abyssinus" conc. layer comes in a few feet below it. Most these concs are barren but some have fossils. They are typified by numerous juveniles, abyssinus, meadowensis, nebraskensis, and P. linguiformis. One or two of these round here, but exposures not good. Better exposures at Loc. 63 to west.

Also present are Gervillia and Nicolleti concs. Total Trail City not exposed but can be blocked in on its conc. layers.

Elk Butte exposures are not good on west and south. Little possibility of section. Use Cobbsus.

**Loc. 61** - South-facing bluff in center NE ¼, sec. 1, T. 14 N, R 21 E, Lantry NW quad, Dewey Co. Land of Oliver Jewett.

Section 1. West end of exposure on shoulder just east of ravine, measuring up from ravine.

| | | |
|---|---|---|
| (1) | 9.0 | Shale, gray, finely silty, few blebs and thin layers silt scattered in it. At top is zone few large ?1', purple brn to brn weathering but little is conc's with golden exterior. Some jarosite stain. Rare fossils. (Long stems) |
| (2) | 7.5 | Shale, chiefly darker gray, silty in bigger blockier breaks than in (1). 2.0± more of dark gray silty shaly clay at base. Minor jarosite stain |
| (3) | 3.3 | Shale as in (1), but slightly silty, weathers brownish with some jarosite stain. In upper 2' scattered red-brn weath. concs of light gray limestone. |
| (4) | 12.0 | Shale, dark gray, thinly interbedded to interlaminated with light gray silt. Jarosite silt pa |

auspicuous in upper part.
At 2.0 above base is zone scattered cone-in-cone in thin bend bentonitic shale.
At 6.5 from base large Spirorbis discus found in place in shale
In upper ten (21) feet, a mixed silt-shale locally.
At top is zone of purple-red exfoliating, lenticular which are light brnish gray on fresh surfaces.

(5) 25.0 Shale, gray, silty, weathers light gray slope. Chiefly a good [illegible] Shale with silt laminae & thin beds and lenses of layer throughout. Shale is [illegible] locally fissured.
At 4.4 feet from base is [illegible] lighter purplish weathering concretions, and a few similar ones are scattered in between it and base of unit.
At 14.0± from base [illegible] gray white weathering [illegible] concretions, [illegible] Irreg. Type. (Sapiola horizon)
At 3.5 from top a brownish

weath, ls. conc. - one of several scattered about.

At top fairly persist. layer calc. brn-weath cones with thick silt, lt gray cone-in-cone jackets.

Upper 10'± of this unit has more mixed than shaly structure

(6) 14.5 Shale as in 5 below, dk gray silt laminae, weath lt gray. Scattered limestone cones with silt jackets, or not, in lower 5'±. Lower 5 has ~~gypsite~~ scattered, local pyrite bed at 8'. Less ~~ferruginous~~ above.

In upper 4' thin beds of silt and vfg sand scattered, some weath rusty brn. Silt siltier at top. Upper 10' is dominantly 'mixed'.

7) 8.5 Shale, gray irreg interlam. or thinly interbedded with yellow brn weath silt and vfg ss. Shale weathers hard chunky lite gray, sand increases upward gradually.

9[sic]?

9. 8.0 As below with finely persistent coal layers at top and base. Lower one brn to redbrn weath is with coal-in-rock silt jackets, are up to 4' diam. Upper are similar.

Section 2 Starting about at foot of slope and measuring up. on S side of toe of spur about 500 ft east section 1.

(1) 12.5 Clay, silty, with blebs of silt-espec. in basal 5.0. Dark gray, blocky, with scour @ base + rusty stain. upper 2.0 is a tough silty clay which is locally sooty & bentonitic; holds small shoulder and weaths to popcorn darker gray than units above.

(2) 45.0 Shale, gray, finely silty, weaths lite gray; grades through sh. and clay to unit 1 in lower 2.5

At about 17' from base scattered red brn. weath. slightly to fairly calc. conc. begin. Fairly persistent layer at 23' from base. Conc zone starts about 12 feet from top, forms local bench or ledge.

At top of unit is ½ conc. layer of large purple-brn concs with golden exterior. This layer = layer at top of unit ⑪, Section 1. This may be upper of 2 layers concs, second coming in 2' below it.

**Loc 60** Exposures on dissected SW-trending spur lying chiefly in S.E. cor SE¼ sec. 36, T15N, R. 21 E., and NE cor. NE¼, sec. 1, T.14N., R. 21 E., Ziebach Co. Also extension E along bluffs into SW cor SW¼ sec 31, T. 15N., R. 22 E. Dewey Co.

Section 1. Ties in with Loc. 61, section 1. Begins, sketch fashion at the purplish-red conc. layer. Meas. up

27.0± From purple-red conc. layer to sezitered brn weathing concs with silty cone-in-cone jackets. This unit = unit 5 of section 1, Loc. 61. Sepiolite float about 15' from top this interval

14.0 Silty clay, clayey mixed silt, bentonitic bleb, one jarosite band 8' from base.

12.0 Silt and shale, mostly thinly bedded, laminated silt and silty shale. Rel. many little jarosite, some vfg sand layers. At top is layer with layer (up to 4' diam) brn weath. calc. concs with silty cone-in-cone jacket.

7.5 [illegible] vfg sand [illegible]

Layer scattered here with q. concs at top similar to those at top unit 3.

Section 2. Continuing up from conc. layer at top unit 4, section 1.

1 16.5 Silt, clayey and sandy, mixed mottled gray + light gray some jarosite blebs. At top is jarosite-stained silt layer with scattered flat, x-lam. sandy silt concs. About 5' + above base a few lg concs with thick silt jackets. Some are fossilif. — Ophiomorpha burrows. Dimic-like scaph. S. leptocheles

2 7.5 Silt, as in (1) below

3 12.5 Mixed silt and sand grading to clayey silty sand. Weathers light yellowish gray. Scatt. calc concs locally about 6' from base.

④ 3.0 – 5.0 Conc. horizon. Scattered huge calc. concs and smaller ones, with thick jackets silty sand locally. Individual concs up to 10' or 12' across, 2.5 ft thick. Chiefly barren, some with few scatt. fossils.

⑤ 27.5 Sandstone, fg to vfg, friable, subgraywacke? weathers buff and contains scattered hard limestone concs many of which very fossiliferous. At top, in upper 2', is conc. layer, large (up to 4'+) brown weath. with numerous Idonearcas. This interval slumped locally, hard to get conc. distrib. in it. Sand has glauconite. Sand includes huge spheres + loose Idonearcas in upper part.

⑥ 141.0± Sand as below, with scattered loose shells of Idonearca and some masses smaller shells. Also local jarosite blebs. Glauconitic to some degree, some OB to O. weath. streaks.

| | | |
|---|---|---|
| ⑦ | 18.5 | Sand as below but becoming clayey locally. Considerable O. stem on buff-gray weathering slope. At top scattered OB weath. cones, highly fossiliferous but "squashed"; |
| ⑧ | 6.0 | Sand as in ⑦ below but not as much clay. At top another zone scattered "squashed" OB weath. cones.<br>This unit may contain other scattered fossiliferous cones in the "squashed" zone. |

Sandy soil. at crest of point.

Loc.s 62 ± 216 Bluffs at toe and W slope of spur trending SW in ~~E½ SW¼~~ W½ SW¼ (E½ SE¼ Sec. 15), sec. 14, T. 20 N., R. 25 E., Miscol NE, quad., Cowsou Co.

Loc. 216 SE¼ SW¼ SW¼ Sec 14

Section 1/ Measuring up from mid-slope above popcorn on upper Pierre, NE¼, NE¼, SW¼, SW¼, sec. 14.

1) ? – 9.5 Clay, gray, silty, weathering light gray, silt irreg. mixed in clay matrix, some brownish + YB stain. Becomes progressively more silty upward, at bot ± of OB weath silt at top

2) 2.0 ± Clay, shaly, silty, dark gray, concentration jarosite in lower foot. At top scatt. Dinic type cones

3) 5.5 Clay, lgt. shaly, silty, with silt content increasing upward. Lower, clayier 2' hz. abundant jarosite. Silt ellipt. irreg mixed, some laminae, weathers yellow brn. to brn gray (lower pt.) Scatt Dinic type cones in lower 2.5 to 4.5 ft, some

full of Dimics. At top
sect. becomes flat ls. conc.

4) 14.0+ Clay, very silty & sandy, chiefly mixed, some sand layers.

At 2.5, pocket less hard ls. conc. (#62, sect. 1, bot B)

At 5.5 Large gervillia concs

At top in grass roots Gervillia — Limnopsis concs

Grass roots

Loc. 62

Section 2: Bluff to W. of trail in ~~NW¼ NW¼ NW¼ SW¼~~ center E½ SE¼ sec. 15, ~~and in adjoining pt of Sec. 15.~~ Excellent exposure from Protocardia layer down.

Measuring up from zone Jarosite concentration = to that at base Unit 2, section 1.

3) 6.0 Clay, silty dk gray, lor. shaly 0.5± jarosite concent. at base, another band of it 3.0 from

base. Zone scrH. Dinic type
cones at top, also a few
within interval.

(2) 13.5

Silt with mixed, sandy interbs
silty dk shale. Becomes
increasingly vfg sandy
upward and about 6
feet from base becomes
sandy silt with minor sh.
Dinic type cones up to
8.0 above base but not
common above 5.0.
Small jacket-less head
is cones with first
spiny scaphites and
sparse g scrH. 8-9 feet
above base. These commonly
have numerous Serpenochilus.

A511

(3) 12.0

Sandy silt as in (2) above,
in lower 5'-8' may be
more shaley.

At base brown + limpsis
big ϕ cones in lower 2'
and Gervillia in following
3.0. locally they run to 4'.

1.6 from

A513

At top 3cm brown & less. Some apparently thin Paleozoic layer upper foot is OB weath, jarosite band = brown layer?

(4) 8.0

Shale, gray, finely silty, brownish gray weath, to checked surface, sharp change from unit below. Zone essentially brown gray-weath color at top

Loc. 30-G. Southeast trending toe of spur
(loc 200)

~~Section 1.~~

Measuring up from conc. layer (C) = Protoceratine conc layer (See page 41 et. seq. for remainder of revised Loc. 30 section)

(1) 3.0 Covered - float shaly

(2) 18.0 Silt, clayey, loc. shaly, blebs and bands of gypsosite. Weathers lite brownish to yellowish gray yellow splotches. Fresh is gray to dk gray chiefly mixed, some silt layers. Very sharp upper contact. Concs like-Duc type, cone in cone jackets, oolitic.

(3) 9.0 Shale, silty, brownish gray, weathers to brownish gray checked slope, very distinct from underlying unit. At top is zone reddish weath. is concs (Zone B) - the barren zone

Loc. 63 Exposures along S to SE-trending spur west of McLaughlin road in center N½ Sec. 8 and S½ sec. 3, T. 20 N., R. 26 E., Little Eagle quad., Corson Co.

A 547 Dinic. concs found on toe of spur in NE¼, SW¼, NE¼, sec. 8.

Most Trail City conc. layers partially exposed on SW slope of hill to NW of toe in NW cor, SW¼, NE¼, and SW cor, NW¼, NE¼, sec. 8. Not good enough for section. At top numerous "Abyssinus-mzunduensis" concs. in place just a foot or two below T. L. sand member.

A 549 A 548 Collections come from above spots chiefly, but also from trace Abyssinus-mzunduensis layer W and N through NE¼, NW¼ sec. 8.

Reconnaissance to Stoneville and vicinity

Peculiar Fox Hills – if it is Fox Hills. Basal contact obscure – best exposures seen on road N. of Fairpoint. Pierre concs crop out N and S of Sulphur Creek. Found some B. grandis – (or would Cobban call it cinolobatus?) with sharp venter – and a smaller baculite (like baculus?) . These seem to be very close to Fox Hills contact. Local farmer reports good plant fossils just N. of here (Sulphur Cr.) about 1.5 mi ± in small ss capped butte. Prob 14 sec. 27 T. 11 N., R. 11 E. This may be promising area to work out Pierre - Fox Hills relationships

Fox Hills of Stoneville area is typified by very light colored sands, lite gray to white with ledgy brown-weath or grey weath. conc. sand which commonly is shot with small spherical conc. structures. Both indurated and friable types ss locally include clay pellets. The so-called Stoneville member is a lignitic shale, lignite & ss. phase of this stuff. Suspect it may be lenticular and relatively local

but Scwright may be right in supposing it a continuous member. Beneath this odd sandy part of Fox Hills is a banded zone that seems to grade to Pierre — but no clear-cut exposures seen.

On Avance road at cattle guard SE cor. of sec. 27, T. 10 N., R. 15 E. some interbedded gray calc. shale and vf silt. Shale is good, vf silty: also highly calc. vfg sandy silt in platy, laminated layer. Could it be Mobridge? To S. at Cherry Cr. crossing good Pierre with several zones between concs. No fossils found in Pierre here, but concs with golden calcite like those bearing B. "grandis" in road N. of Fairpoint are sparingly represented in base terrace gravels above the Pierre cuts on N. side Cr.

N. from the calc. shale at cattle guard no exposures of anything resembling Fox Hills. Hell Creek-like lithology begins about 3 miles S of what was once Avance.

On Rt. 73 south of Faith similar story. From undoubted Pierre to obvious Hell Creek there is no outcrop of Fox Hills. It seems to be a completely soft unit, and may resemble Hell Creek.

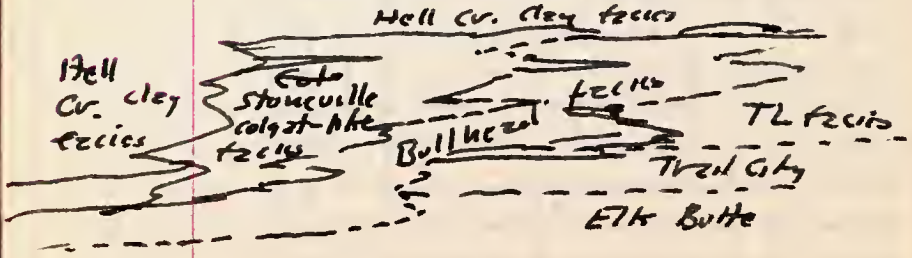
Conclusions: The Stoneville area Fox Hills is a unique facies of the fm. If it is Fox Hills. Possibly it is all a Hell Creek facies — sandier than normal, which grades to marine & brackish Fox Hills eastward. Possibly it is a locally thickened "Colgate" facies — which it resembles somewhat more than Hell Cr. As a unit it probably = the Elk Butte, Trail City, Timber Lake & Bullhead members of the Moreau-Grand divide.

Best possibility of resolving problem seems to be study of beds in & to <u>north</u> of Sulphur and Cherry Creek valleys. <u>If</u> typical Hell Creek can be demonstrated to overly Stoneville facies N or NW, or interfinger

with it, that is probably best that can be had from poor exposures. Seems to be little possibility of tracing Stoneville facies east or NE from its area - the typical features appear to be gone by the Marcus-Avance road. Might be able to get some stuff along Red Owl → Opal roads.

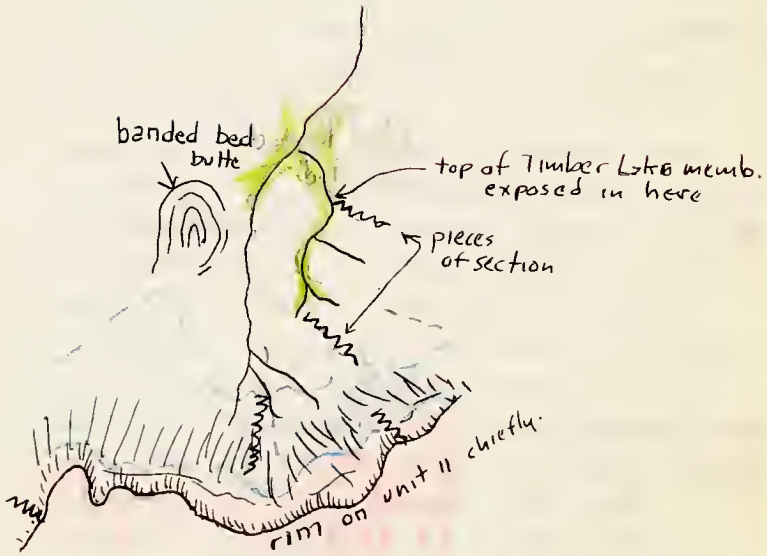
Stoneville facies, contrary to Seawright, does not seem to contain much "typical Fox Hills" Tho locally some buff-weath. subgraywackes like those of the Colgate of the Haplymenites beds. These mostly above the coal-bearing part. The facies must = Elk Butte to Colgate, or to Bull Head, as it rests on Pierre with "Mobridge" fossils.

Guess as to relations



W N E S

Loc. 48 detail




Fox Hills — TL sand
Banded beds + overlying silt
? - - - - Fluted SS = Colgate?
Hell Cr — Lignite-bearing sequence with wood + dinosaurs

**Loc. 48** Badlands bluff facing NE on S. side Hump Cr. in SE¼ sec. 31, T21N, R. 23E., Corson Co., about 1 mile due E of SD 65.

Hump Creek section: Pieced from exposures just E and SE of small braded-butte in E½, NW¼, SE¼, sec. 31. Measuring up from gulley floor —

11.0 – ? A370 Sandstone, friable, greenish gray, fine- to med. grained, slightly glauconitic network of O.B stained large Halymenites in lower 6', in massive SS, some scolithus Taenidia.

Upper 5', cross-laminated, some tabular layers gray shale impregn. by Fe, no Halymenites, One lime cemented conc of Ostrea pellucida, Pteria linguiformis, Tellina sp., Pteria nebraskensis, and plant fragments about 1 foot from top. At top considerable OB wash cone. chips. A sharp contact.

~~A 371~~

(5) 21.0 Braded silty, bentonitic, fissile, brownish gray shale and thin beds of siltstone and fine to med. grained sandstone Lower 4.0 is chiefly shale with few thin bed. sandstone as in (1) below – to contains glauconite

grains. Beds become more sandy upward with thickening indiv. ss layers & silting up of shale. Whole unit weathers with bzuded popcorn, surface, some fluting but not prominent. Some ferrosilic concret. loc. in silts & sands, some OB stain loc. Small brown lime-cemented silt & sand cones in upper part, some ovoid others irreg. & flat showing bedding

(3) 8.0 ~~Lower 5 to 10' A~~ gray clay silt, with plant trays, weathers to popcorn-like surface, is slightly calc., blocky fracture weathers fluted. O-B chips Fe cemented clay scatt on crop

(4) 35.0 weath lite yellowish to brownish gray Sandstone, fine to med. gr. "subgraywacke" type, loc somewhat clayey, weath light gray checked & fluted surface, has scattered OB, punky cones which give it blotchy appearance; these chiefly in lower few feet which is massive as unit 4 below, or shows much-

contorted bedding and locally lime-indurated concretion-like bodies of cross-bedded and/or contorted ss.

Above this the unit contains elongate but lenticular thin beds of lignitic, locally shaly sand, some are dipping or arcuate. Also small OB weath cones scattered thruout and in stringers.

From about 22.0 to 30.0 above base are the large, cone.-like concentrations of x bedded ss which weather into huge spheroidal masses 8'± in diam.

Above this, ss as below with more lignitic lenses to local beds and locally, abundant small Fe cones

The ss in this interval is Colgate-like, a fairly 'dirty' subgraywacke, may even have some glauconite locally - at least it has some light-green grains

At top ss is loc. indurated - not by CaCO3.
Contact is sharp, loc. irreg.

Note: to east along bluff from
Section the silt and clay
unit 6 thickens and becomes
a prominent, grey-white, fluted
unit.* The lignite beds (base
point (b) below them and
locally truncate by the grey so
that contact with unit (4)
is rarely obscure, rarely
a change from the sand to
a silty or sandy clay or silt
clay. Succeeding units
to the quadrangle at such
places or elsewhere of the
area mapped.

* Does this thicken upon further
east?

| | | |
|---|---|---|
| | | (base Hell Creek?) |
| (5) | 2.5 | Shale, silty at base, brown to lignitic with pods and thin streaks vitrain-like coaly material 0.5 to 1.0 from base hard ferruginous concs made up of mush of fossil wood, + plant detritus, some dinosaur bones loc scattered in this interval. A second such conc layer at top this interval |
| Co478 | | |
| (6) | 8.0± | Shale, brownish gray, plant frags, locally lignitic, an OB weaths, lite gr. silty zone 2.5-4.0 above base and some scatt OB weath concs above. Loc. lignitic layer about 2.5 from top. And ferrug concs, punky at top. |
| (7) | 4.0 | Silt light gray shale, weathers lite gray with blotches Fe-OB. stain from scattered Fe concs |
| (8) | 3.0 | Shale, light brush gray, silty, plant frags. Has 0.5 lig. sandy clay at top. |
| (9) | 11.0 | Sandstone, lite-gray, X-lam, some lig laminae loc., weaths fluted, has small ovoid ferrug. concs. |

Resembles ss below unit 5.
In upper foot becomes shaly

10) 5.0 — Lignitic shale, weathers lig. brn, commonly has gray blocky bentonitic shale at base

11) 2.5 – ? — Silt, light gray, locally indurated ($SiO_2$?) to blocky, platey gray white ledge with orang stain on some surfaces. Caps bluff locally. Locally soft. Some log chunks wood in place.

Loc. 30 Revised section date! From several localities in vicinity of section 30.

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30-H

Part I Begins on grassy flat in shale and ascends

① 6.0 Shale gray to dark gray, fissile with local blocky seams. Weaths to gray checked surface under which small silver-gray chips. Non calc.

② 1.0 Hard gray shale with concretionary cone layer, prob. in bentonite or bent. shale at top. Surface is dark gray popcorn.

10.0 [illegible]-gray popcorn on gray shale with brownish cast & purple blue stain. Only loc. popcorn, elsewh brownish-gray checked surface.

④ 5.0 Gray checked surface on fissile shale with brownish cast. Copper loc. by blue-black ironstone concr., some purple-brownish weathe.

| | |
|---|---|
| | Some weath cream color on surface |
| (5) 25.0 ± | From conc layer to change from gray to light gray. |
| Part II. | From foot of spur |
| 1) 11.0 ± | Shale, brownish gray, somewhat silty covered by popcorn crust. At top is less fissile smwt siltier sh. holding edge of spur. Wths dk gray to gray |
| 2) 9.0 ± | Shale, dark gray, slightly silty, weathers gray. Contains scattered purple to purple brn weath concs. |
| - - - | - - change from gray to light gray |
| 3) 21.5 | Shale, silty, weathers light gray. The change in color here is widespread and appears fairly sharp on weathered surfaces, but in trench no break, just fairly abrupt increase in silt streaks, pods + grains. Scatt. pods jarosite from 14 above base (possibly lower) top taken at O.B. Fe + jarosite band with scatt. silty conc in cav |

concs.

* At 15.5, from base, lowest jarosite + Fe band

④ 13.5 Interval to Limopsis conc. in place

⑤ 19.[illegible] Interval Limopsis to Protocardia

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Locality 30F

Part III Begins at a jarosite-Fe band and ascends.

① 7.5 Silt, somewhat clayey, mixed, gray weaths lite gray some scatt. Fe stain. Loc. shaly, some vfq sand

At top layer reddish weath. ls. concs with few scattered D. nicolleti. Some at this layer and below have D. nic conc type silt jackets. Some jarosite blebs and Fe stain in silt layer about 6' from base (could be upper Fe stained layer, or not). No concs seen in place below this but exposure mediocre.

② 5.5 Silt, as below, with scatt. concs

that weath. reddish tint of
brn or light gray to cream color,
commonly have fucoidal mkgs
on surface, range from small,
golf-ball size to irreg. flattened
ovoid. Some scatt. ones have
D. nic - type silt jackets.
Some single D. nicolleti and
body chambers fat Scaphites.
No concentrations D. nic.

③ 10.0 Silt, as below, weaths light gray,
is gray. A few scatt small
cones as in ② below in
lower 4 ft. At top is rusty
brn weath conc layer which
locally has Limopsis
accumulations.

④ 10.0 Silt, gray, weaths light gray,
becoming shaly. Some interbeds
& laminae of silty shale in
upper 6 feet

⑤ 9.0 Shale, silty, gray fissile,
interbedded to inter-laminated
with silt which increases
upward. At base, odd wood-like
plant stems coming out

locally. Beginning 1.5 to 2.0 ft feet above base are scattered reb. small ovoid, irreg. log-like concs. Some with sepiolites. This is zone in which sepiolites occur locally. Concs are gray ls, but the weath cream colored to reddish gray tints, many have fucoidal surface marking, most are brown.

About 1' from conc layer at top is foot ± ufg OB weath. sand. At top Pholeozudiz layer — mostly brown, weath red brn gray silt jacket's. few weath cream.

Part IV = 30 G. section 1, p. 30, this utblr
200

Part V Measuring up from brown layer top Pt IV.

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Loc. 30-C.

(V) 18.0 Silt, gray shaly with some (interbed) shale, gray, fissil, finely silty, which weaths light gray. At base is 1.0 silt, shaley, mixed some fossil [illegible] rusty brown

In upper 5.0 has ~~sandy~~ vfq sand mixed in & increasing upward

At top is layer large (Av. ~~about~~ 1.5 diam) calc. coars weathy rusty brn to purplish brn, brittle, with golden calcite in flecks. Very rarely fos. One freq D. nebrascensis seen in one. These are scattered, loc. have silty jackets, some up to 3' long diam.

② 10.5

Sand, vfq, silty, clayey, prom. more of a silt at base but vfq sand, subhorizontal, at top. Upper 3.5 weathers to OB, chief band is about 1.5 thick and 2 ft from top. Here it is a vfq to fq sand with some glauconite. In the brown band, locally, are accumulations of shells, loose or in punky red weathy sandy coars. Has, Protocardia, ~~Pleuro lingulaformis~~ Pyropsis. Some also at top of interval (P. linguiformis locally & Protocardia)

3 4.0

Clay, sandy & silty dk gray, mixed with clayey sand. Weathers gr

④ 12.0

Sand chiefly VFg, clayey + silty in lower half, becoming sand with few clay blebs above. Weathers yellowish gray (fits T.L. color in this part section) At top dzyer scattered distinctive cones which weathe yellowish gray on outside, buggy red + purple red inside.

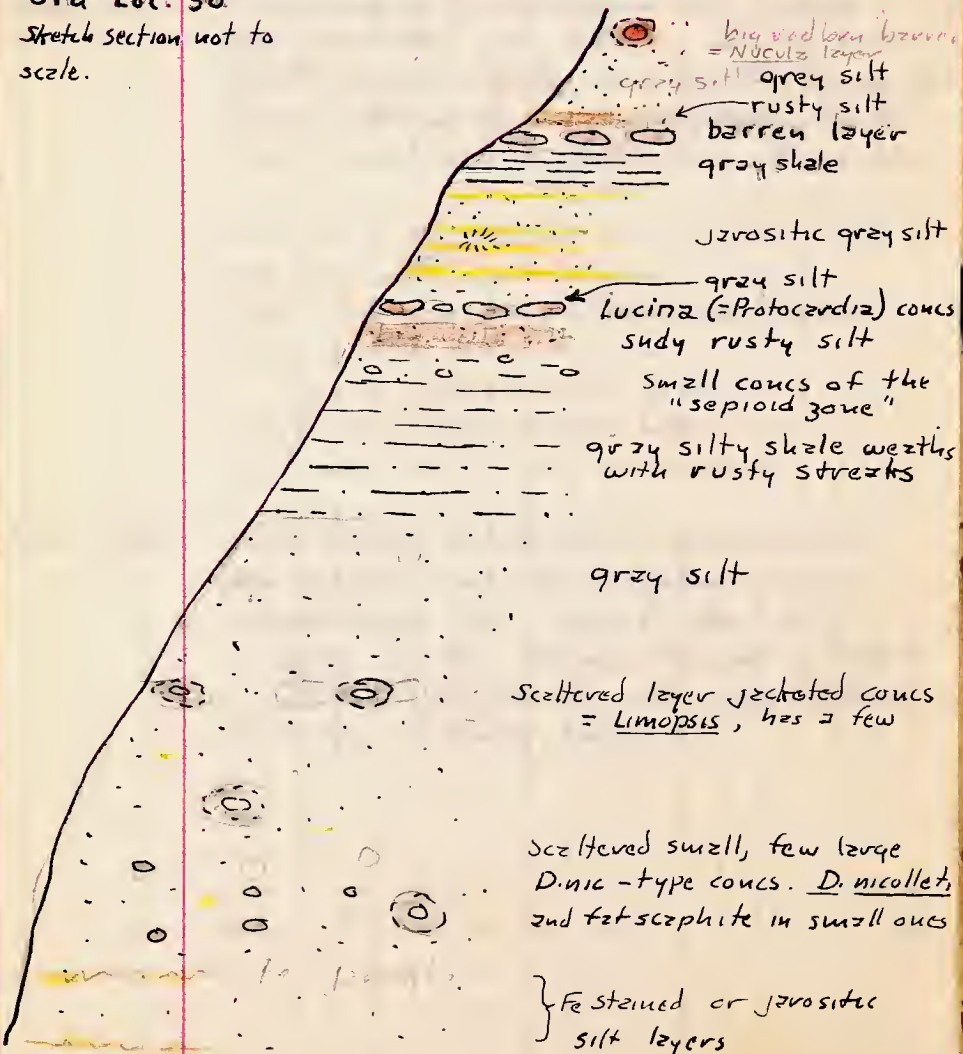
⑤ 20.0

Sand VFg (to some fg at top) subgray weathe Some clay interstitial + blebs. weathes yellow gray, some OB weath in coarser upper 2.0 which contains large red brn weath. Is cones, some in self jackets. Turse chiefly brown but a number contain large Sphenodiscus.

Laterally, to N. small scatt. largely foss. cones come in in the upper 40 feet

Old Loc. 30

Stretch section, not to scale.



Loc. 64

A section of Whitehorse ridge not visited in 1957. It extends ~~W~~ E ~~S~~ E from SE¼, NE¼, SW¼, sec 20 T. 16 N., R. 26 E into ~~SE corner~~ little fault valley in NW cor. sec. 28

One of best places for a skeleton section of concretion layers. Goes from Elk Butte to well above Protocerdia layer.

Collected here with Sohl.

Loc. 65

Elk Butte section measured by Mello and Rzhinsky from exposures at west foot of ragged butte along Meadow Creek in SE¼, SW¼, SW¼, sec. 36, T. 15 N., R. 23 E., Dewey Co.

Loc. 65 Section measured and sampled by Mello and Radinsky.

Measuring up from 4.0 above creek level

(1) 10.0 Shale, light gray & fissile on weathering, dark grey, slightly calcareous fresh, very little silt.

At base 0.2 to 0.3 layer calc. light-gray, hard silt.

A 9.0 scattered small white-weath. dark ls. concs.

At top 0.4 white-weath. bentonitic shale, possible "show" bentonite at 8.5.

~~Loc 68~~
~~Loc 66~~

Breien area loc 259

Northeast of Breien

Section 1 Measuring up from hard lig. underclay

| | | |
|---|---|---|
| (1) | 11.0 | Lignitic shale and thin beds lignite in lower 3.0' grades up into grey silty blocky shale. Weaths brownish up to 6.0 from base, light grey above |
| 2 | 8.0 | Worm-worked silt and v fg ss in lower 3.0', mottled grey & light grey, jarosite stain common. Has minor clay, local, clayey sand & silt<br>Upper 5.0 fg ss shale blebs & thin beds basal foot O-B stained "tubes" and small ferruginous concs in it. Sand is lite grey, weaths somewhat buff. Sand gets mg at top, somewhat glauconitic, is grey, speckled with dk minerals. |
| (3) | 3.0 | Dark grey clay shale becoming sandy top & base and grading into units above & below. Has scattered plant frags. Upper foot with 1B greenish ss layers. |

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| | |
|---|---|
| (4) 6.0 ± | Sandstone, f-g, greenish-grey glauconitic weathers rusty grey (buff), has OB weath conc partings and Helymenites |
| | roots — lig shale comes in just above. |
| Section 2. | East end of same Butte. Have about 2 feet of fluted Colgate like ss at base may be the top of Fox Hills |
| Weathering Flat | |
| 1 1.0 | Sandstone chiefly f-g, subgrey weathers lgt grey, weath fluted, has some brownish str. Jeweseta [illegible] at top. |
| Sharp [illegible] | irreg. |
| (2) 0.5 - 1.0 | Hard ligniticc silt, loc. shely pl[illegible] frags brown to purple grey. |
| (3) 5.0 | Silt, clayey loc., silty clay in basal 1.0 ±, light grey, weathers checked to locally hard crust. Has numerous irreg. ferrug. concs weath OB and purple, Scatt upright tree trunks. rooted in (2) below |
| (4) 0.3 ± | Bentonite |

| | | |
|---|---|---|
| (5) | 0.3± | Shaly lignite, lig. shale. |
| (6) | 3.0 | Clay, finely silty grey, OB terrug cones, weathis grey checked to ~~tan~~ subpapsroid, OB stain loc. |
| (7) | 1.0± | Shale, brownish plant frags |
| (8) | 1.5 | Clay as in (5) below |

Liquitic shale & lignite at base section 1.

~~Loc 67~~ loc 260

Crow Ghost cemetery sections

Section 1. Measuring up from in Colgate.

① 20.0 to ? Sandstone, light grey, friable, weathers to intricately fluted walls and bedland slopes, Is a subgraywacke with some scattered grains glauconite.

disconformity. slightly irregular, locally channeled contact.

② 2.0 Silt, sandy, lignitic. weathers brown with purple cast, has fragmental carbonized plant remains. Large tree stumps upright in upper surface

③ 2.5 Intraformational Grey bentonitic shale and greenish gray bentonite, weathers to popcorn clinker then surrounding greys.

④ 1.3 Lignite, shaley, black. and carbonaceous shale

| | | |
|---|---|---|
| ⑤ | 1.7 | Silt, shaly, light brownish gray, carbonized plant specs |
| ⑥ | 6.3 | Siltstone, clayey, hard blocky. Light gray, weathers to checked surface. upper 2.0± grades to brownish lignitic silty clay at top. Spotty jarositic stain lower half. |
| ⑦ | 3.0 | Shale, brown, silty, streaks lignite. |
| ⑧ | 10.5 | Sandstone, fine-grained, friable weathers to checked light gray surface OB & jarosite stain at base. Lignitic sand lay 7.2 to 7.5 ±. Above this lig layer sand weathers yellowish gray, has some thin beds & strings of shale & lign. sand. This unit becomes clayey laterally, generally fairly clayey in upper foot. |
| ⑨ | 1.5 | Silty shale, brown, lignitic. |
| ⑩ | 4.0 | Silt, clayey - mixed zone of "worm-like"?, mottled gray & light-gray clayey silt & silt. Jarosite |

blebs and some, rusty Fe stain. Becomes sandy at top and contains stromatolites + balls of shale in upper 1.3' inside of being mixed.

(11) 2.5 Sand, fine grained, gray, lt yellow. subgraywacke with scatt. glauconite grains. OB tube-like cones and cone pertings. Some clay blebs.

(12) 1.3 Shale, dark gray, "clay", prob. bentonitic, forms popcorn crust.

(13) 1.2 Sand, fine grained, greenish gray with scatt. ferruginous concretions Fe brown - OB impreg. locally, weathers gray to

CO328

(14) 3.5 Shale, dark gray, clay sh, some thin layers & stringers of at top and base

(15) 2.1 Sand, fine grained, gray, loc. greenish gray, weathers, somewhat yellow gray. OB stain, stringers and tubules. Also some scatt. Fe stone cones. Friable, Some shale layers in lower foot. Weathers to yellowish

(16) 3.8 Sandstone, light gray, fg to vfg & silty subgray wacke. Thin liquitic sand layers scattered in it. Becomes clayey upward, sand in layers laterally. Weathers light gray to white in contrast with buff to greenish weathered ss below

(17) 2.0+ Shale, silty, brown, liquitic. Capped by layer ferruginous concs.

(18) 12.5 Gray clay & silty clay with 3 ft clayey sand to fg ss at base.

(19) 1.0 Shale, brown, [illegible] lcc. liquitic.

(20) 5.5 Clay with some shaly liq. ptgs, upper 3ft silty & brn to clayey sand, ss ferruginous seam at base (fg sand)

(21) T.D. Clay, light brn, lcc. large Fe stone

| | | |
|---|---|---|
| | | concs at top. |
| (22) | 2.0 | Sand, light gray, some ferrosilic at base. |
| (23) | 2.0. | Tough sandy clay with coal plant stringers & fragments. Is sandy clay, gray to dk gray at top |
| (24) | 11.0 | Sand, fluted base, some clayey cherted zones, usual Hell Creek light gray |
| (25) | 10.0 | Sandy clay and clay, layers dk gray clay coal flecks about 4' from top. |
| (26) | 15.0 – ? | Sand, light gray, weathers buff. local fe stone concs at base. The buff color may result from weathering – most buttes in area have uppermost sand buff – esp where gravel-capped. |

1959

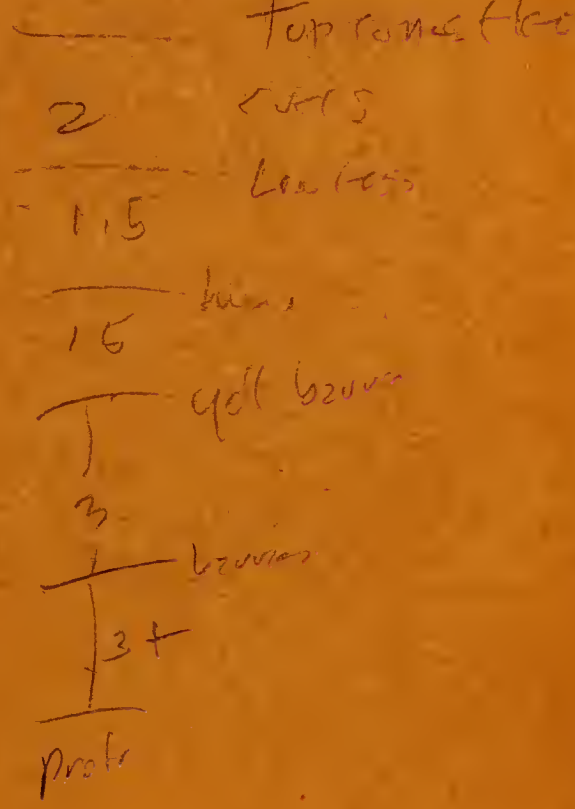
Shipping list continued from NTBK 1954-1

| | |
|---|---|
| Box 15 | Loc's 34 and 54 |
| Box 16 | Foram samples - Loc. 60 & 61 |
| Box 17 | Foram samples - Loc. 61 |
| Box 18 | Loc. 55, 20-A, Fire Butte, Whitehorse Rd. |
| Box 19 | Locs, 58, 59, 9, S of 34, 56 C lith, Jims 103, Bullhead Tuscredia beds. |
| Box 20 | Locs, 100, 30 D, 30 E, good specs. no locality - loose. |
| Box 21 | Loc. 53 |
| Box 22 | Loc. 53, 52 |
| Box 23 | Loc. 52, 51 |
| Box 24 | Loc. 51 |
| Box 25 | Loc 51 |

Box 26 - NAIL KEG - Sepioids various locs & Loc. 56

| | |
|---|---|
| Box 27 | Bullhead - River concentrate - Protocardia and Drepanochilus |
| Box 28 | Bullhead - River concentrate - Protocardia and Limopsis, Grevillia, unknowns |
| Box 29 | Wakpala fossil samples |
| Box 30 | Loc. 63, miscell. 30, 30-G, 103, 65. |
| Box 31 | Loc. 30, G & H, Locs 65, 64. |
| Box 32 | Locs 64, 57 |
| Box 33 | Loc. 57 |
| Box 34 | Loc. 57, 50 |
| Box 35 | Loc. 50 |
| Box 36 | Locs, 50, 30 |
| Box 37 | Loc 62 |
| Box 38 | Loc 62, Hump Cr. samples, Geol 10 spec. - small unlabeled packs. |
| Box 39 | Geol 10 specimens |

| | |
|---|---|
| Box 40 | Not Loc. 63 Town Eagle Butte, ½ mi S of Eagle Butte, Old Rt 63 loc. SW Eagle Butte, Miscell. small lots |
| Box 41 | Loc 30-F, 30-G (one), Sample conc types., Century D. neborascensis. |
| Box 42 | Loc. 60 - large sphenodiscids |
| Box 43 | Loc. 60<br>Breien fossils - Crow Ghost Cemetery |
| Box 44 | Foram samples - Virgin Cr. 1-4<br>Loc. 65 1-14?<br>Breien - Loc #1 |
| Box 45 | Loc. 66<br>Loc. 64<br>Crow Ghost foram samples |
| Box 46 | Loc. 60 - Scaphoid + big Spheno<br>ST Pats Butte - various upper fauna<br>Odds + Ends<br>Len's stuff. |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1.5
16
3
3+